UNITED STATES DEPARTMENT OF AGRICULTURE

FOREST SERVICE RO

REPLY TO: 3430 Evaluation DATE: October 11, 1984

SUBJECT: Efficacy of three fungicides for control of Sirococcus tip blight of Jeffrey pine at the Humboldt Nursery (Report No. 84-38)

TO: Forest Supervisor, Six Rivers National Forest

Fungicide trails in 1983 at the Humboldt Nursery indicated that three fungicides -- chlorothalonil (Bravo W-75), triadimefon (Bayleton 50 WP), and ectaconazole (Vangard 10W) -- effectively controlled Sirococcus tip blight of Jeffrey pine (reference 3430 Evaluation, Report No. 83-22, September 22, 1983). Bravo W-75 is currently being used for control. Because triadimefon and ectaconazole gave 97% and 98% control respectively when applied at 4 week intervals they were tested further to determine the most effective frequency of application. The results of these additional tests are presented below.

The trial was initiated in November 1983. A randomized complete block design -- with 1) no fungicide, 2) 2 lb/100 gal of Bravo W-75 at 4 week intervals, 3) 8 oz/100 gal of Bayleton 50 WP at 4 weeks, 4) 8 oz/100 gal of Bayleton 50 WP at 8 weeks, 5) 130 ml/100 gal of propiconazole (Tilt 3.6 EC) at 4 weeks, and 6) 130 ml/100 gal of Tilt 3.6 EC at 8 weeks as the six treatments -- was used in a 1-0 bed of Jeffrey pine. Tilt 3.6 EC, a fungicide of similar chemical structure as Vangard 10W, was used instead of Vangard because it is further along in the registration process. The experiment was replicated four times. Each replicate covered 18 ft of bed (six, 3 X 4 ft plots), with the six treatments randomized in each replicate. Efficacy of treatments was evaluated by counting and removing dead or cankered seedlings in July 1984. Remaining seedlings were counted to obtain a total count per plot, and percentage of seedlings infected by Sirococcus strobilinus in each treatment was determined.

Results of the study are presented in the following table:

PERCENTAGE OF JEFFREY PINE SEEDLINGS INFECTED BY SIROCOCCUS STROBILINUS AT THE HUMBOLDT NURSERY, 1983-1984 TRIALS

TREATMENT	PERCENT OF SEEDLINGS INFECTED[x]
Tilt 3.6 EC, 4 week	2.2[a]
Tilt 3.6 EC, 8 week	4.4[ab]
Bayleton 50 WP, 4 week	6.3[ab]
Bravo W-75, 4 week	7.9[ab]
Bayleton 50 WP, 8 week	9.5[b]
Control	25.1[c]

[x]Means followed by the same letter are not significantly different (P = 0.05) according to Duncan's multiple range test.

All five fungicide treatments tested resulted in less than 10% infection and gave significantly better control of Sirococcus tip blight than no fungicide treatment. Although Tilt at 4 or 8 weeks and Bayleton at 4 or 8 weeks were effective, they did not give significantly better production against the disease then the currently used practice of Bravo at 4 week intervals. However, either of the two fungicides applied at 8 week intervals were as effective as Bravo applied at 4 week intervals. Tilt at 4 week intervals gave significantly better control than Bayleton at 8 weeks, but the necessity to treat twice as often and the current lack of registration of Tilt for use on conifers would offset the gain (2.2% infection vs. 9.5% infection). Current labeling for Bayleton includes use of the fungicide on pines for protection against Fusiform rust and on ornamental pines. Therefore, the fungicide could be used at Humboldt on Jeffrey pine. Tilt is currently registered only for control of rusts and powdery mildews in grasses grown for seed.

Under the conditions that the trials were conducted, Tilt and Bayleton effectively controlled Sirococcus tip blight. Either fungicide (if registered) applied at 8 week intervals could replace the 4 week application of Bravo with no significant increase in infection.

Tilt and Bayleton have several advantages over Bravo. Both are systemic, sterol inhibitors, readily taken up by plants, and would be less likely to be washed off by the frequent rains that occur at Humboldt during the period most favorable for infection. Because Tilt and Bayleton could be applied at one-half the frequency of

Bravo, reduced amounts of pesticides would be introduced into the Nursery environment. Disadvantages of Tilt and Bayleton include 1) lack of current registration for Tilt, and 2) the need to purchase, store, and use additional pesticides. Douglas-fir and true fir seedlings at Humboldt are routinely treated with Bravo. Since Jeffrey pine is a minor crop at the Nursery, it may be more efficient and economical to treat all beds at the same time with the same fungicide.

Alternating fungicides for the control of a specific disease to reduce the risk of resistant fungus strains developing is a standard nursery practice. Humboldt Nursery should consider alternating Bayleton with the currently used Bravo treatment. For example, if fungicide application for Sirococcus control began in January, Bayleton could be used during this rainy period. A March treatment (8 weeks later) with Bravo, followed by a April treatment with Bayleton would protect the seedlings over a 6 month period with three treatments instead of six if Bravo only was used.

Forest Pest Management is pursuing the registration of Tilt for use on pines.

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